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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/759,376	01/15/2004	Stephen Clark Purcell	022193-060710US	6693

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EXAMINER
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SONG, JASMINE

ART UNIT	PAPER NUMBER
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2188

DATE MAILED: 05/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/759,376	<b>Applicant(s)</b> PURCELL ET AL.	
	<b>Examiner</b> Jasmine Song	<b>Art Unit</b> 2188	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 February 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 21-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 and 25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 21-24 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01/15/2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## Detailed Action

1. This office action is in response to Amendment filed 02/18/2005, claims 20-25 are newly added claims, therefore, claims 1-25 are pending in the application. All rejections and objections not explicitly repeated below are withdrawn.

## Specification

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

## Election/Restrictions

3. Restriction to one of the following inventions is required under 35 U.S.C. 121:

Group I. Claims 1-20<sup>and 25</sup>, drawn to a method or an apparatus of sending a selected memory transaction to a memory bank, classified in class 711, subclass 158.

Group II. Claims 21-24, drawn to an apparatus of employing a Multiplexer to regulate a plurality of memory transaction, classified in class 710, subclass 51.

4. The inventions are distinct, each from the other because of the following reasons:

Inventions Group I and Group II are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, each of the invention in Group I and II has separate utility because the invention of group I has separate utility in an apparatus of sending a selected memory transaction to a memory bank, the invention of group II has separate utility in an apparatus of employing a Multiplexer to regulate a plurality of memory transaction. See MPEP § 806.05(d).

5. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification and recognized divergent subject matter, and because the divergent searches required for the different groups, restriction for examination purposes as indicated is proper.

6. Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 21-24 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

7. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim

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remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(h).

### **Claim Rejections - 35 USC § 102**

8. The rejection of claims 1-19 has been maintained and updated as shown below. In addition, the newly added claims 20 and 25 also have been rejected as shown below.

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1-20 and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Novak et al., U.S. Patent 6,295,586 B1.

Regarding claim 1, Novak teaches that an apparatus comprising:

a queue (one of the AQ 340, PQ 350 and RWQ 360 as shown in the Fig.2) storing a plurality of memory transactions (col.9, lines 3) to be sent over a memory bus (Fig.1 or Fig.2, element 100) to a memory having a plurality of memory banks(Fig.1, element 70, col.6, lines 32-34), each memory transaction addressed to one of the memory banks (col.6, lines 53-56 and lines 63-64 and col.7, lines 9-11 and lines 46-53); and

an arbiter (Fig.2, SPM 370) coupled to each of the plurality of memory transactions (it is inherent that the SPM 370 coupled to each of the plurality of memory transaction since the SPM 370 selects an operation to be sent to the memory, in order to select an operation, SPM has to coupled to each memory transactions) and configured to generate a plurality of bank readiness signals (it is taught as the requester send to the arbiter will assert the bank readiness signals), each bank readiness signal indicating the readiness of one of the memory banks to accept a memory transaction (col.11, lines 14-17), and

select one of the memory transactions for transmission over the memory bus based on the bank readiness signals (col.11, lines 17-22).

Regarding claim 2, Novak teaches that further comprising:

a memory controller (Fig.1, element 200, col.5, lines 23-30) configured to send the selected memory transaction (the selected operation with highest priority) over the memory bus (Fig.1 or Fig.2, element 100).

Regarding claim 3, Novak teaches that further comprising:

a queue controller (Fig.2, element 365) configured to associate with each of the memory transactions a different priority in a set of priorities (col.9, lines 11-19); and wherein

the arbiter (Fig.2, element 370) is further configured to select the one of the memory transactions when the bank readiness signal indicates that the memory bank to

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which the one of the memory transactions is destined is ready to accept a memory transaction and the priority associated with the one of the memory transactions is greater than a priority associated with any of the other memory transactions (col.11, lines 12-22).

Regarding claim 4, Novak teaches that wherein:

each priority represents an age of a memory transaction is taught as each entries in the operation queue has a priority and strictly adhering to timing dependency (col.9, lines 5-19).

Regarding claim 5, Novak teaches that wherein:

The plurality of memory transactions enter the queue at a first request station and progress toward a second request station until selected for transmission over the memory bus based on the bank readiness signals (col.7, lines 46-49).

Regarding claim 6, Novak teaches that wherein:

the arbiter is further configured to send a memory transaction to a memory bank, clear the bank readiness signal for the memory bank at approximately the time of sending the memory transaction to the memory bank, and set the bank readiness signal for the memory bank a predetermined period of time after sending the memory transaction to the memory bank (col.9, lines 22-26 and col.11, lines 12-22).

Regarding claims 7, 13 and 19, Novak teaches that a method comprising:

identifying a plurality of memory transactions (col.9, lines 3, the queued operations within three queue as shown in the Fig.2) to be sent over a memory bus (Fig.1 or Fig.2, element 100) to a memory having a plurality of memory bank (Fig.1, element 70, col.6, lines 32-34), each memory transaction addressed to one of the memory banks (col.6, lines 53-56 and lines 63-64 and col.7, lines 9-11 and lines 46-53);

generating a plurality of bank readiness signals by monitoring the memory bus (col.7, lines 44-45 and lines 51-53, since only one bank of one CS can send or receive data over the memory bus, therefore, by monitoring the memory bus will know a plurality of bank access and then generating a plurality of bank readiness signals), each bank readiness signal indicating the readiness of one of the memory banks to accept a memory transaction (col.11, lines 14-17); and

selecting one of the memory transactions for transmission over the memory bus based on the bank readiness signals (col.11, lines 17-22).

Regarding claims 8 and 14, Novak teaches that further comprising:

sending the selected memory transaction (the selected operation with highest priority) over the memory bus (Fig.1 or Fig.2, element 100).

Regarding claims 9 and 15, Novak teaches that wherein each of the memory transactions is associated with a different priority in a set of priorities (col.9, lines 11-19), and wherein selecting further comprises:



selecting the one of the memory transactions when the bank readiness signal indicates that the memory bank to which the one of the memory transactions is destined is ready to accept a memory transaction and the priority associated with the one of the memory transactions is greater than a priority associated with any of the other memory transactions (col.11, lines 12-22).

Regarding claims 10 and 16, Novak teaches that further comprising:

associating the priorities with the memory transactions based on an age of the memory transactions is taught as each entries in the operation queue has a priority and strictly adhering to timing dependency (col.9, lines 5-19).

Regarding claim 11, Novak teaches that generating comprising:

generating the bank readiness signals using a state machine coupled to the memory bus is taught as the MCT 200 handles generation, prioritization and management of operations with the memory (col.5, lines 26-30).

Regarding claim 17, Novak teaches that the content of the memory bus comprises an address of a memory transaction monitored by a state machine (it is implied in the reference because an address of a memory transaction has to be known in order to select one request to be sent to the SMC).

Regarding claims 12 and 18, Novak teaches that wherein generating comprises:

sending a memory transaction to a memory bank; clearing the bank readiness signal for the memory bank at approximately the time of sending the memory transaction to the memory bank; and setting the bank readiness signal for the memory bank a predetermined period of time after sending the memory transaction to the memory bank (col.9, lines 22-26 and col.11, lines 12-22).

Regarding claims 20 and 25, Novak teaches that the plurality of memory transactions are sent over the memory bus one memory transaction at a time (col.7, lines 51-53).

### **Response to Arguments**

11. Applicant's arguments filed 02/18/2005 have been fully considered but they are not persuasive.

In response to the applicants' argument that Novak fails to teach or suggest an arbiter coupled to each of the plurality of memory transactions and configuration to generate a plurality of bank readiness signals (claim 1), it is noted that this limitation is taught as an arbiter (Fig.2, SPM 370) coupled to each of the plurality of memory transactions (it is inherent that the SPM 370 coupled to each of the plurality of memory transaction since the SPM 370 selects an operation to be sent to the memory, in order to select an operation, SPM has to coupled to each memory transactions) and configured to generate a plurality of bank readiness signals (it is taught as the requester send to the arbiter will assert the bank readiness signals).

In response to the applicants' argument that Novak fails to teach or suggest generating a plurality of bank readiness signals by monitoring the memory bus (claim 7, 13 and 19), it is noted that this limitation is taught as generating a plurality of bank readiness signals by monitoring the memory bus (col.7, lines 44-45 and lines 51-53, since only one bank of one CS can send or receive data over the memory bus, therefore, by monitoring the memory bus will know a plurality of bank access and then generating a plurality of bank readiness signals).

### **Conclusion**

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

13. When responding to the office action, Applicant is advised to clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the

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art disclosed by the references cited or the objections made. He or she must also show how the amendments avoid such references or objections. See 37 C.F.R. 1.111 (c).

14. When responding to the office action, Applicants are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist examiner to locate the appropriate paragraphs.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jasmine Song whose telephone number is 571-272-4213. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on 571-272-4210. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306.

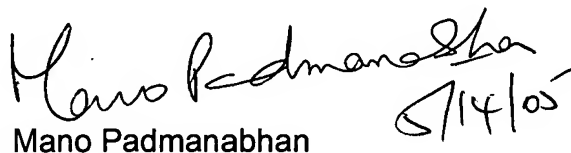
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Jasmine Song



Patent Examiner

May 13, 2005

  
5/14/05

Mano Padmanabhan

Supervisory Patent Examiner

Technology Center 2100

**MANO PADMANABHAN  
SUPERVISORY PATENT EXAMINER**